REMARKS

Claims 1-35 are pending to the present application. By virtue of this response, No claims have been cancelled, amended, or added. Accordingly, claims 1-35 are currently under consideration. Amendment and cancellation of certain claims is not to be construed as dedication to the public of any of the subject matter previously presented.

General Comments

Applicants would like to thank supervising Examiner Rodriguez for returning Applicants' call on December 19, 2007, and suggesting different options Applicants may pursue. In addition, Applicants thank Examiner Rodriguez for investigating into the issue that whether the Examiner of record has changed his position from parties' previous agreements. Applicants will take the advice of Examiner Rodriguez to work with the Examiner of record to resolve the outstanding issues when he returns on January 22, 2008.

Applicants respectfully submit that in the interview dated June 13, 2007, Applicants have explained the differences between the pending application and the Tcherniaev and Zhou references. Although there was no agreement between the Examiner and Applicants to put any of the pending claims in condition for allowance, there was an agreement that the Tcherniaev and Zhou references, alone or in combination, do not disclose the pending claims. As a result of this agreement, Applicants filed an RCE (on 6/13/2007) to allow the Examiner to conduct a new search for references that may disclose the pending claims. This agreement is consistent with the new search conducted by the Examiner and Examiner's statement that "Applicant's arguments filed 06/13/2007 have been fully considered **but they are moot in view of the new grounds of rejection**" in the 7/30/2007 Office Action. For the record, an excerpt of the interview summary filed on 6/13/2007 was included below.

> "Claims 1, 12, and 23 were discussed in light of the Tcherniaev and Zhou references cited in the final Office Action. Applicants explained the response to final Office Action filed on January 16, 2007. Specifically, Applicants explained the differences between the

> pending claims and the Tcherniaev and Zhou references in terms of how dynamic information are communicated between the driver leaf circuit(s) and the receiver leaf circuit(s). In the case of the pending claims, a dynamic data structure called the port connectivity interface is used to accomplish this task. While in the Tcherniaev or the Zhou reference, alone or in combination, no dynamic data structure is created for this purpose. The communication of dynamic information is accomplished by traversing the multiple levels of the hierarchical data structure, which lowers the performance of the transient simulation."

In the Office Action dated 7/30/2007, Applicants note that the Examiner primarily repeated the same rejections in the 11/13/2006 Final Office Action, relying on the Tcherniaev and Zhou references again to reject most of the claim elements. Although the Examiner has introduced the Zhong reference (US 6,865,525) as a new reference in this Office Action, Applicants submit that the focus of the Zhong reference may have been misplaced.

The Office Action relies on the Zhong reference that allegedly discloses the element of "storing simulation results of the one or more driver leaf circuits and the one or more receiver leaf circuits in a memory device" of the pending claims. This is evident because the Office Action states that "Zhong teaches a circuit simulation system and apparatus that includes a dynamic storage that stores/maintains variables or other intermediate information during the execution of simulation." Applicants note that this claim element was added to overcome the 101 rejection, not to overcome the 103 rejection in the 1/16/2007 response to the final Office Action. The section of the Zhong reference cited by the Office Action merely discloses a random access memory (RAM), which does not disclose other elements of the pending claims, which were previously at issue and the new search would be conducted with respect to the claim elements previously at issue. Therefore, Applicants respectfully submit that **the 7/30/2007 Office Action has not explained why the newly introduced Zhong reference is relevant to Applicants previously presented arguments**, although the Office Action indicated that "Applicant's arguments filed 06/13/2007 have been fully considered but they are moot in view of the new grounds of rejection."

Claim Rejections – 35 U.S.C § 103

Claims 1-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tcherniaev et al. (U.S. Pat. No. 6,577,992), in view of Zhou et al. (U.S. Pat. No. 6,807,520), and in further view of Zhong (U.S. Pat. No. 6,865,525).

In response, Applicants respectfully submit that each of the Tcherniaev, Zhou, or Zhong reference, alone or in combination, does not teach or suggest each and every element of the pending independent claims 1, 12, and 23. Applicants submit that one of the key differences between the current invention and the cited references lies in how dynamic information among the circuit components under simulation is communicated and what data structure are used for communicating such dynamic information during a transient simulation. It is known in the art that during a simulation, the simulator needs to keep track of port connectivity information of the circuit components. It is also known that during a simulation, the circuit components will go through different dynamic states. So the issue is not whether the port connectivity information or dynamic states exist or not, but how are they stored or used by the simulator.

Specifically, the combination of the references cited does not teach or suggest at least the element of "simulating operation of the one or more driver leaf circuits and the one or more receiver leaf circuits, together by using a port connectivity interface, without simulating operation of the third branch to determine a first set of changes in signal conditions shared by the one or more driver leaf circuits and the one or more receiver leaf circuits, wherein the port connectivity interface facilitates communications of dynamic information between the one or more driver leaf circuits and the one or more receiver leaf circuits, and wherein dynamic hierarchical data structures of the one or more driver leaf circuits and the one or more receiver leaf circuits are maintained."

The Office Action cites Figures 1-2, and column 7 line 15 to column 10 line 65 allegedly teaches these claim elements, Applicants respectfully disagree. In the cited references, they chose to store such information in the static database while the current invention uses a newly created dynamic data structure called the port connectivity interface for storing and communicating such

dynamic information during simulation. However, there is major design tradeoffs involved in each implementation approach. The pending application describes the Tcherniaev and Zhou approaches in Figure 6 and its corresponding paragraphs [0018] – [0020] in the background section of the specification. Both the Tcherniaev and Zhou approaches employ pointers to pass such dynamic information through the subcircuit instances (See Figure 2C of Tcherniaev and Figure 10 of Zhou.) Therefore, to pass information from one subcircuit to the next subcircuit in a different hierarchical branch, such as from subcircuit 620 to subcircuit 622 as shown in Figure 6 of the pending application, the simulator of the Tcherniaev or Zhou reference would have to made multiple program calls (via the pointers). As indicated in the background of the pending application, the problem with the method taught by Tcherniaev and Zhou references is that the dynamic information needs to traverse many levels of the hierarchical data structure before reaching its destination. At each hierarchical level, information needs to be synchronized before it may be transmitted to the next level, which the Tcherniaev and Zhou references are totally silent about these challenges. Therefore, the method of passing information through the hierarchies, as taught by Tcherniaev and Zhou, and synchronizing at each intermediate level would result in lower simulation performance.

As stated above, merely mentioning the terms "port connectivity" and "change of node voltage" does not indicate a particular approach used by the simulator. On the contrary, the Tcherniaev reference teaches a different approach for storing and handling dynamic information created during the simulation. For example, the Tcherniaev teaches that "[T]he static storage may therefore store the matrix structure. As described above, the static subcircuit storage 212 may further include a subcircuit definition 217 that defines the subcircuit topology. In addition, the static subcircuit storage 212 may provide element definitions 219 associated with the subcircuit definition 217." (See Tcherniaev, column 9, lines 50-55, emphasis added.) The Tcherniaev also teaches that "[I]t is important to note that the circuit simulation is advantageously accomplished by traversing a hierarchical data structure such as that illustrated in FIG. 2A without flattening the hierarchical data structure." (See Tcherniaev, column 10, lines 7-10, emphasis added.) The Tcherniaev further states that "[I]n addition to sharing an equivalent circuit structure and therefore static subcircuit storage, two subcircuit instances may have an equivalent dynamic voltage state obtained during transient simulation. As shown in FIG.2C, multiple instances 224, 226, 228 of the same subcircuit definition

may share the same static subcircuit storage 212 as described above." The Tcherniaev reference further teaches that "one or more pointers ... may be used to permit both the first instance 224 and the third instance 228 to share this dynamic voltage state." (See Tcherniaev, column 10, lines 17-33, emphasis added.) Applicants also note that column 14 lines 39-54 and column 16 line 35 to column 17 line 47 of the Tcherniaev reference teaches updating rate of change in node voltage, again by using pointers to traverse the hierarchical data structure. It is clear that the Tcherniaev reference teaches storing dynamic simulation information in the static subcircuit storage and using pointers to traverse the hierarchical data structure for passing dynamic information among subcircuits under simulation. The Tcherniaev reference is totally silent about the challenges, such as multiple program calls and synchronization issues, associated with its approach. The present invention solves the problem by using the port connectivity interface to facilitate communication of dynamic information among circuit components under simulation.

Regarding the Zhou reference, The Office Action cites Figures 4, 9, and 10, and column 12 line 58 to column 14 line 60 allegedly teaches these claim elements, Applicants respectfully disagree. Applicants note that the cut node method described in Figures 4 and 9 of the Zhou reference is similar to the static partitioning method described in Figure 5 and its corresponding paragraphs in the background section of the pending application. The method taught by Zhou is similar to that taught by the Tcherniaev reference. For example, the Zhou reference states that "[T]he connectivity information is a static database." "The static data structure 530 contains: 1) connectivity information; 2) model parameters; and 3) matrix formulations for the cell. This information is not time varying and is also the same for each instance of a same cell." (See Zhou, column 13, lines 5-16; emphasis added.)

In addition, the Zhou reference teaches that "[D]ynamic information is stored in a flattened way and static information is shared and stored in a hierarchical fashion by the present invention." Because the dynamic information is stored in a flattened way, the dynamic hierarchical data structure is destroyed in the Zhou approach. Therefore, Applicants further submit that the Zhou reference does not teach or suggest at least the claim element of "wherein dynamic

hierarchical data structures of the one or more driver leaf circuits and the one or more receiver leaf circuits are maintained" found in the independent claims 1, 12, and 23 of the pending application.

For at least the reasons presented above, Applicants respectfully submit that each of the Tcherniaev or Zhou reference, alone or in combination, does not disclose each and every element of the independent claims 1, 12, and 23. Applicants also assert that claims 2-11, 13-22, and 24-35, which variously depend from their independent claims, are allowable for at least the reason that they depend from allowable independent claims.

With respect to claims 2, 13, and 24, based on the arguments presented above, Applicants respectfully submit that the combination of the Tcherniaev, Zhou, and Zhong references does not teach or suggest at least the element "storing the first set of changes in signal conditions in a the port connectivity interface and conveying the first set of changes in signal conditions from the one or more driver leaf circuits to the one or more receiver leaf circuits via the port connectivity interface."

With respect to claims 3, 14, and 25, based on the arguments presented above, Applicants respectfully submit that the combination of the Tcherniaev, Zhou, and Zhong references does not teach or suggest at least the element "wherein the port connectivity interface is generated dynamically upon detecting a set of triggering conditions during simulation."

With respect to claims 4, 15, and 26, based on the arguments presented above, Applicants respectfully submit that the combination of the Tcherniaev, Zhou, and Zhong references does not teach or suggest the specific data structures as stated in these dependent claims.

With respect to claims 5-11, 16-22, 27-33, Applicants submit that these claims are allowable for at least the reason that they variously depend from allowable independent claims.

Claims 34-35 are rejected under 35 U.S.C. 103(a) as being upatentable over Tcherniaev et al., in view of Zhou et al., and in further view of Zhong, as applied to claims 1-33 above, and further in view of Johannsen (U.S. Pat. No. 5,910,898). In response, Applicants respectfully submit that

claims 34-35 are allowable for at least the reason that they depend from an allowable independent claim.

CONCLUSION

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to withdraw the outstanding rejection of the claims and to pass this application to issue. If it is determined that a telephone conference would expedite the prosecution of this application, the Examiner is invited to telephone the undersigned at the number given below.

In the event the U.S. Patent and Trademark office determines that an extension and/or other relief is required, applicant petitions for any required relief including extensions of time and authorizes the Commissioner to charge the cost of such petitions and/or other fees due in connection with the filing of this document to Deposit Account No. 03-1952 referencing docket no.**188122001900**. However, the Commissioner is not authorized to charge the cost of the issue fee to the Deposit Account.

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